quality to those found in the United States. There are certain notable exceptions, however, as the pili nut (*Canarium luzonicum*), which is abundant and superior to the almond in quality, and the wild mango (*Mangifera caesia*), with its delicious flavor. Nuts, seeds, fleshy fruits, buds, leaves, roots, and tubers are included in the list, and the drawings and photographs used to represent them are of excellent quality.

A companion report by WEST and BROWN[17] deals with native resins and oil-producing plants, which are rather numerous. One difficulty in the utilization of the resins of many of the trees is to be found in the large number of species found in any particular area, making the number of individuals of any one species in any locality rather small. Several of the oil-producing plants give promise of good results under cultivation. In this report, also, the illustrations and descriptions give much botanical information.—GEO. D. FULLER.

Ecological research.—In his report of the work of the Carnegie Institution for 1920, Director MACDOUGAL[18] indicates the lines of research being followed by various members of his staff, and affords hints of results being attained. He has been measuring in detail the growth of certain trees and the accumulation of food material by the potato. CANNON and FREE have continued their investigations of the growth of roots as related to aeration. The factors affecting plants in new habitats have been under investigation by MACDOUGAL, and his results seem to show that species may be the more readily transferred from cool regions to warm, from montane regions to maritime, and from regions of climatic extremes to those of equable climates than the reverse. SHREVE reports progress in a soil temperature survey of the United States and Canada, in his investigations of the arid Avea Valley, and in his explorations of the Santa Lucia Mountains. Mrs. SHREVE has studied seasonal changes in the transpiration of *Encelia farinosa*, and VINSON and GRIFFIN have investigated the changing composition of Salton Sea water. The strand vegetation near Monterey, California, has been examined by COOPER, and stations and quadrats established for more exact studies of the associations and their controlling factors. Evaporation rates on the Monterey peninsula are decidedly less than in the oak and chaparral region east of Monterey, and this may account for the pine forests covering the former area.—GEO. D. FULLER.

Calcicoles.—In a discussion of plants found on soils supposed to be calcareous, SALISBURY[19] makes it clear that the problem of the limitation of the

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[17] WEST, A. P., and BROWN, W. H., Philippine resins, gums, seed oils, and essential oils. Phil. Dept. Agric. and Nat. Res., Bur. For. Bull. **20**: 1–230. *figs.* 73. 1920.

[18] MACDOUGAL, D. T., Department of botanical research. Carn. Inst. Wash. Year Book for 1920. **19**: 49–81. 1921.

[19] SALISBURY, E. J., The significance of the calcicolous habit. Jour. Ecol. **8**: 202–215. 1920.

species to this substratum is by no means a simple one. In the first place, there is great need of more accurate data regarding the exact distribution of such "calcicoles" and of the exact nature and chemical reaction of the soils in which they are growing. As an example of the need of such precautions it is shown that "calcifuges" may and do occur on soils usually considered calcareous, but on account of leaching there is really no calcium in the soil in contact with the plant during its youthful and critical stages. It is further shown that complexity is added to the problem by the secondary characters usually accompanying calcareous soils, such as their comparative freedom from toxic products of decay, their usually low water-holding capacity, the more abundant development of their soil fauna, and the influence of calcium upon the absorption of other elements such as potassium.

The entire discussion is a thoughtful consideration of the various aspects of the problems concerned, and with the rather extensive bibliography is a good survey of the entire field.—GEO. D. FULLER.

Forest trees of Hokkaido, Japan.—Recognizing in the rapid changes taking place in Hokkaido a menace to the existence of its forests and its timber supplies, the government has appreciated the importance of a scientific knowledge of its trees as a basis for increased attention to forestry. As a result of the investigations thus prompted, there is being issued a most attractive set of beautifully colored plates, accompanied by descriptive text in Japanese and English.[20] The plates depict the foliage, flowers, fruit, buds, seeds, and seedling stages, one plate being devoted to each species. The three fascicles now issued include *Taxus cuspidata*, *Abies sachalinensis*, *A. Mayriana*, *A. Wilsonii*, *Picea Glehni*, *P. jezoensis*, *Larix dahurica*, *Pinus pentaphylla*, *P. pumila*, and *Thujopsis dolabrata*. The finished work will comprise not less than 85 species.—GEO. D. FULLER.

Notes on Conifers.—Two botanical memoirs by CHURCH[21] will be of interest to teachers of botany, especially those most concerned with morphology and forestry. These papers are used at Oxford in class work, making it unnecessary for the students to take lecture notes, and, at the same time, furnishing very complete outlines for laboratory work. Both papers lay emphasis upon features which can be seen without a compound microscope, although the microscope is used for some details of the life history. The first paper is

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[20] MIYABE, KINGO, and KUDO, YUSHUN, Icones of the essential forest trees of Hokkaido. 10.5×15 inches. Sapporo. Pub. by the Hokkaido government. Fasc. 1.1–15. *pls 1–4*. 1920; Fasc. 2.16–26. *pls. 5–7*. 1920; Fasc. 3.27–37. *pls. 8–10* 1921.

[21] CHURCH, A. H., Elementary notes on Conifers. Botanical Memoirs. no. 8. Oxford University Press. pp. 32. 1920.

———, Form factors in Coniferae. Botanical Memoirs. no. 9. Oxford University Press. pp. 28. 1920.